

REMARKS

Claims 10-18 are pending in the present application. Claims 10 and 15 were amended in this response. No new matter was introduced as a result of the amendments. Support for the amendments may be found, for example in FIG. 1 and paragraphs [0021-25]. Entry of the amendments and favorable reconsideration is respectfully requested.

Claims 10-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over *McGrath* (US Patent 6,366,950). Applicant respectfully traverses these rejections.

Specifically, *McGrath* fails to teach or suggest the features of “producing at least two virtual sound sources via the acoustic reproduction device, wherein each of the at least two virtual sound sources are arranged in succession with regard to time” and a control unit that “controls simultaneous repeated movement of each of the at least two virtual sound sources in succession from a predetermined starting point to a predetermined ending point, and wherein each virtual sound source is moved in succession, back again to the starting point after reaching the predetermined ending point, and wherein the control unit controls a direction of movement for the at least two virtual sound sources such that the direction of movement coincides with the direction of the movement to be simulated” as recited in claim 10 and similarly recited in claim 15.

For the purposes of explanation only, the amended features include at least two virtual sound sources arranged in succession with regard to time (e.g., VS A, VS B - see FIG. 1), where, at a specific starting point (e.g., $T = 0$ s), the virtual sound sources are in an initial formation, where they are situated on a common line. As time progresses (e.g., $T = 2$ s, 4 s), all of the virtual sound sources are moved successively (i.e., moved one interval) until reaching an end point (e.g., $T = 6$ s). At this time, the leading virtual sound source (VS A) is moved behind the previous virtual sound source in the successive formation (VS B), which means that the previous virtual sound source (VS B) becomes the leading source and the moved virtual sound source (VS A) becomes the lagging sound source. The resulting effect is that a person who is at a reference point perceives the at least two virtual sound sources as a single sound source which is essentially at a fixed location but simulates movement from the starting point to the ending point.

In contrast, *McGrath* teaches a system and method of increasing the perceived reality of the audio stream of an A/V production, where the method includes the steps of: (a) locating a series of speakers along a periphery of the viewing audience; (b) panning an audio stream

between the series of speakers so as to provide for the sense of an audio sound moving along the side of the viewing audience (see Abstract). In FIG. 2, *McGrath* discloses that a series of speakers (10-19) are placed down each side of the cinema audience to provide a larger degree of spatialization of audio tracks around a listener whilst maintaining a degree of "coherence" in the sound registering at the ears of each audience member (col. 2, lines 56-63). Under one embodiment, *McGrath* teaches that a virtual sound 35 is simulated which moves from a left speaker 33 to a right speaker 34 at a constant velocity (i.e., amplitude panning) through three intermediate positions 36, 37, 38 (col. 3, lines 4-17). Under another embodiment, *McGrath* discloses that, not only are the speaker signals panned, but the left/right channel stereo signals from virtual sound source 35 also undergo a varying delay shifting with respect to one another (col. 3, lines 30-39; FIGs. 4-5). The degree of delay is created so that two sounds projected from each speaker 33, 34 can better give the effect of apparent movement of the virtual sound source 35 for all audience members, not just those located on center.

While *McGrath* admittedly is capable of producing multiple sound sources, the disclosed processing described above relates to individual virtual sound sources, and not ones that are arranged in succession to each other. The passages cited in the Office Action (col. 3, lines 2-3; col. 4, lines 19-20) appear to only describe different sound sources that are respectively processed in the disclosure of *McGrath* (i.e., movies will inevitably contain a multitude of different sound sources). Applicant maintains that the disclosure in *McGrath* only appears to disclose a single virtual sound source in each case:

- "It is desired to simulate a virtual sound 35 . . ." (col. 3, lines 5-6);
- "The resultant effect is that the listener 30 will not experience the same sensation as listener 31 that the virtual sound source has moved closer to speaker 34 . . ." (col. 3, lines 23-25);
- "The degree of delay is created so that two sounds projected from each speaker 33, 34 can better give the effect of apparent movement of the virtual sound source 35 for all audience members . . ." (col. 3, lines 35-38);
- "Observing FIGS. 4 and 5 in combination, at a time when the position of the virtual source is at location 36, the sound from left speaker 33 is of greater amplitude and lower delay than for right speaker 34 . . ." (col. 3, lines 40-43, et al.);

- “[E]ach listener has nonetheless experienced the sensation of the virtual sound source moving from left to right . . .” (col. 4, lines 5-8);
- “The shaping of the time delay signals can determine to what extent the spatialisation effects of the audio stream are experienced by the listeners and will depend on case specific factors such as speaker separation, the number of speakers in the array, the speed of the virtual sound source . . .” (col. 4, lines 9-13);
- “The arrangement discussed in respect of FIG. 3 can be extended to an audience environment and, for example, projecting virtual sounds travelling down the side of the audience. Such an arrangement is illustrated schematically in FIG. 6 wherein a listener 40 listens to a virtual sound source 41 which travels at a constant velocity down their right hand side so that moments later it is at the point 42” (col. 4, lines 20-27);
- “Similarly, as shown in FIG. 8, the signal to each speaker is delayed depending on a current location of the virtual sound source.” (col. 4, lines 31-33)

It is not understood by Applicant how multiple virtual sound sources are disclosed in McGrath as alleged in the Office Action. It is presumed that, if multiple virtual sound sources are provided in McGrath, the panning/delay performed must not only take into consideration the effect on one virtual sound source, but also must account for the panning/delay relationship between each virtual sound source to other virtual sound sources. Otherwise, it would be difficult, if not impossible to achieve a proper spatialization of the virtual sounds. However, Applicant cannot find any teaching or suggestion in McGrath that remotely discusses such an arrangement. As argued previously, *McGrath* teaches away from using more than one virtual sound source, as the entire disclosure of *McGrath* is premised upon panning or delaying a singular source to give it the proper spatialization within the listening environment. It follows that *McGrath* also fails to teach or suggest moving the at least two virtual sound sources in succession from a predetermined starting point to a predetermined ending point, and back again to the starting point as recited in the amended claims.

For at least these reasons, Applicant respectfully submits the rejection is overcome and should be withdrawn. Accordingly, Applicants respectfully request that a timely Notice of Allowance be issued in this case. If any additional fees are due in connection with this application as a whole, the Examiner is authorized to deduct such fees from deposit account no.

02-1818. If such a deduction is made, please indicate the attorney docket no. (0112740-1068) on the account statement.

Respectfully submitted,

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